# 12. Major Conference Themes: An Integration and Summary

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The conference discussions covered a broad range of topics in considerable depth, and generated a rich set of observations regarding the course of the information revolution throughout the world. A number of major themes emerged during these discussions. We integrate and summarize them here.

## A Vision of the Information Revolution Future: "The Great Information Revolution Attractor"

Across the many, highly varied conference discussions, a shared picture emerges of the world towards which the information revolution is driving humanity. This future world should be thought of as a destination towards which all regions and nations are being drawn, at varying rates and from varying distances removed.[38] This "great information revolution attractor" is characterized by a number of interrelated features, including:

- *A rise in "information work" and "information workers,"* as an ever increasing fraction of economic activity and the overall workforce, with a broad range of consequences.
- *New business models,* for the internal organization and functioning of business enterprises, and for their external interactions with customers, suppliers, and competitors.
- *The rise of electronic commerce,* as a major form of economic activity, with accompanying changes in the nature and structure of markets and the elimination of a wide variety of "middlemen" heretofore facilitating economic transitions.

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[38] One is reminded, by analogy, of the "Great Attractor" in astronomy, a region 200 million light-years away in the direction of the constellation Sagittarius, towards which all of the galaxies in the vicinity of the Milky Way are being drawn. (See Dressler, 1987, and Kraan-Korteweg and Lahav, 1998.)

- *Challenges to the power and authority of the nation state,* for a variety of reasons (including the two immediately following).
- *The creation of a wide variety of sub-national, trans-national and supra-national groupings, communities, organizations and enterprises,* in the business, social, and political realms, often largely beyond the control of individual nation states.
- *An ever increasing porosity of national borders,* to trade and financial flows, to population flows, and to the flow of ideas, entertainment, and culture.
- *Many new winners, and also many new losers.* Some individuals, groups, localities, nations and regions will gain (in power, influence and material well being) as a result of the information revolution; others will lose. All will not share equally in the benefits.
- *New fault lines, within and between nations.* The widening gulfs between the educated, wealthy, and cyber-privileged of all nations, on the one hand, and the not-so-lucky of all nations on the other, will lead to fault lines within nations as well as between nations.

Different regions of the world react differently to this presumed future, to this "great IR attractor": some accept it more or less unquestioningly; some wish to modify it; some strive to achieve it; some try to resist it. We return to these regional differences below.

## Some Recurring Concerns Regarding This Future

The conference discussions also reveal a number of widely shared concerns regarding this information revolution future:

### *Increasing Disparities*

As indicated above, this information revolution future (the "great IR attractor") brings with it many winners and many losers, thereby most probably increasing the disparities (economic, social, and political) that exist within societies and between nations. The adverse social and political consequences of these increased disparities are a frequently expressed concern.

These concerns manifest themselves in different forms in different regions of the world.

- In North America, in concerns regarding the disenfranchisement of the "information poor."

- In Europe, in a determination to alleviate such disparities insofar as possible.
- In some regions of the world (e.g., India), in a determination not to be left behind by the information revolution (i.e., to be one of the winners, not one of the losers).
- In other regions of the world (e.g., portions of the Middle East), in a possible reluctance to continuing playing a "losing game" supposedly imposed upon them by the West.[39]

How various nations react to these concerns could well affect the course of the information revolution in their regions.

### *Impacts on Individual Privacy*

The impact of the information revolution on individual privacy is a concern shared widely throughout much (but not all) of the world. This concern stems initially from several factors:

- The strong desire of many individuals, primarily but not exclusively in Western cultures, to retain some control over who knows what about them.
- The transfer of more and more personal information into databases accessible over the Internet.
- The use of this personal information by burgeoning new service businesses, to tailor products to individual tastes, to handle secure electronic transactions, to offer streamlined payment and delivery, and to target advertising and promotion.

There is some ambivalence about this issue, among many of those concerned about the possible loss of privacy, because many people value the personalized products and services that result.

As "ubiquitous" sensor technology spreads throughout the world and increasingly couples physical space to cyberspace,[40] these privacy concerns are broadened to include possible "sinister" uses of such surveillance technology (by governments, etc.).

These privacy concerns are strongest today in Europe and North America, but present elsewhere as well. How various nations react to these concerns could

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[39] What such nations could do to get out of this "losing game" remains to be seen.

[40] See p. 9 for examples of such ubiquitous sensors.

also affect the course of the information revolution in different regions of the world.

## *Impact on National Cultures*

The increasing porosity of national borders to the flow of ideas, entertainment, and culture has facilitated the spread of Western, and particularly U.S., culture throughout the world. Many people feel that the continued vitality and possibly even long-term existence of their national cultures may be threatened by this process. These concerns manifest themselves in many non-Western settings (e.g., throughout much of the Islamic world), and also in some Western settings (e.g., France, Canada, etc.)

These concerns are widespread but by no means universal. How various nations react to these concerns could also affect the course of the information revolution in their regions.

## *Governance in the Information Age*

The information age changes both the character and distribution of political power, as well as reconfiguring the processes of governance.

Regarding the distribution of political power: The power of the state is being modified as new non-state actors are being empowered, including transnational business organizations, sub- and transnational special affinity groups (ranging across the religious, ethnic, professional, criminal, etc., spectra), and other non-governmental organizations (NGOs).

This leads to various concerns: What will the role and authority of national governments be vis-a-vis these emerging non-state actors. Will there be new allocations of power? Will power be shared in new and different ways? Who will be accountable in the future information age? Will more and more decisions affecting nation states be made by actors not accountable to the citizens of those states.

Such concerns are just beginning to manifest themselves.[41] How they play out could also affect the course of the information revolution.

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[41] The demonstrations at the World Trade Organization meeting in Seattle in early December 1999 (after this conference was over) may be an early manifestation of such concerns.

Regarding the process of governance: Traditional mechanisms are becoming increasingly problematic, as the information revolution allows action beyond the reach of national governments. For example:

- E-commerce will make transaction taxes (e.g., sales taxes) more difficult to collect. This could lead to more reliance on other types of taxes.
- Regulation and licensing will become increasingly difficult when service providers are beyond national jurisdictions.
- Limits on offensive or dangerous information (.e.g., pornography, hate literature, bomb-making instructions) will not always be honored by others.

In these and other areas, governments will have to find new mechanisms of governance, or will have to create new, near-universal international control regimes.

### *Inability of Nations/Societies to Go Their Own Ways*

Economies of scale in information-rich activities are potentially very large. For this reason, nations/societies will pay an increasing price for being different. For example:

- It will be hard for western Europe and the United States to maintain different standards for data privacy and protection.
- Widely disseminated content -- video, text, etc. -- will have a big cost advantage over content tailored to a specific small market. For this reason, nations such as Canada will find it difficult to maintain "Canadian content."
- A handful of technical standards (regarding information and communication formats, etc.) will likely dominate throughout the world, even if these are less than ideal in certain settings.

Because nations/societies will be less able to tailor information services to their specific needs, we must expect frictions over the character of the emerging global services.

## Some Key Uncertainties Regarding the Future

All is not clear regarding this information revolution future. Key uncertainties include:

### *The Future Course of IT Penetration*

How deeply and quickly will the Internet and the accompanying information revolution penetrate, in various regions of the world? How many of the information-poor will it reach in the advanced nations? How fully will it reach into the less developed nations?

How IT penetration plays out will affect the balance of winners and losers in the new information age, both within nations and between nations.

### *Uncertainties Regarding "Proximity" in the Information Age*

In principle, information technology can be used to replace physical proximity with functional proximity, for many human activities. In practice, however, face-to-face interactions still seem to be needed in many circumstances.

This leads to a number of questions: What constitutes effective "proximity" in the information age? When are face-to-face interactions still needed? When will interactions via cyberspace suffice?

In addressing these questions, some find it useful to draw a distinction between "explicit knowledge" and "tacit knowledge."[42] In this view, physical proximity is not required for the exchange of explicit knowledge; it is required, however, for the effective sharing of tacit knowledge.

How this question plays out will affect the geographic dispersion or clustering of many different types of economic activity, as the information age progresses. Will various activities be dispersed widely (e.g., through out-sourcing or "off-shoring"), or concentrated in geographical clusters?

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[42] Roughly speaking, in this context explicit knowledge is knowledge that is clear cut, unambiguous, and well understood by all. Tacit knowledge is knowledge that is implied or inferred, and is not generally understood by all. Explicit knowledge is generally available. Tacit knowledge rests in the minds and creative behaviors of individuals and teams, both within and between organizations. See Porter (1998).

### *The Future Evolution of "The Great IR Attractor"*

The future world described by "the great information revolution attractor" is not a static world, with characteristics fixed forever in time. Rather, it changes as new technology developments occur. It is a "moving target" towards which the world is being drawn.

This leads to several related questions: How will the current technology drivers of the information revolution evolve over the next 10–20 years? What new technology drivers may emerge during that period of time? What new characteristics might "the great IR attractor" assume over the next 10–20 years?

These questions will be the subject of a future conference.

## Differences in Regional Emphasis Regarding The Future

There are differing emphases in various regions around the world, insofar as the information revolution future is concerned. As reflected in the breakout group discussions during the conference, these differing emphases appear to be as follows:

### *North America*

The predominant North American attitude could be characterized as "information revolution determinism." The information revolution is viewed as being inevitable. It will run its course no matter what. Backlashes of various forms are expected to occur, but these are not considered likely to sufficiently retard or modify the process.

Concerns are expressed regarding the disenfranchisement of the "information poor," leading to increased social stress and stratification. Conflicts over privacy are also expected.

But in the end, the information revolution is expected to prevail. North America is in the camp that accepts the information revolution as being more or less irresistible and socially beneficial.

### *Europe*

In Europe there is much more of a focus on realizing (economic) value from the information revolution <u>while</u> at the same time maintaining and protecting

existing cultural and social values. Europeans believe that they can and must actively shape the course of the information revolution to achieve these ends.

There is much more of a determination to alleviate disparities (between winners and losers) insofar as possible, than appears to be the case in the U.S.[43] There are also major concerns about maintaining privacy.[44]

Europe is in the camp that wants to shape the course of the information revolution, to suit its own ends. To what extent it can do this remains to be seen.

### *Asia Pacific Region*

The emphasis in the Asia Pacific region is on realizing value from the information revolution -- primarily economic value. There is less concern with disparities, and less concern about privacy (possibly because of the "communal" nature of Asian culture). The prevailing attitude appears to be: "Don't worry about losers; concentrate on becoming a winner." There appears to be widespread confidence that many/most Asian countries can become winners.

The Asia Pacific region appears to be in the camp that is striving to achieve the information revolution, striving to reach "the great IR attractor," and is generally confident that it can do so.

### *Middle East, Africa, and South Asia*

This part of the world is often characterized by strong differences in focus between leadership/elite groups and mass citizenry. Many leaders/elites want, and use, the benefits of information technology -- but are wary of its influences on the citizenry.

In some major nations (e.g., India), there is a determination not to be left behind by the information revolution (i.e., to be one of the winners, not one of the losers). As one conference participant from this part of the world said: "We missed out on the industrial revolution; we don't want to miss out on the information revolution." In these nations, there is much discussion of what it takes to get access to and successfully exploit information technology, to raise the nation/region (economically, socially, etc.) But it often proves difficult to expand

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[43] Canada may be closer to Europe than to the U.S. on this issue.

[44] Currently, these concerns regarding privacy are greater in Europe than in the U.S.

"islands" of information-revolution expertise, both within nations and to the rest of the countries in the region.

Some other nations' leaders/elites in the region may already anticipate losing, and may be starting to imagine dire consequences. But many citizens are unaffected and unconcerned now, and will be into the indefinite future.

Especially in this region, much of the information revolution emphasis may be on non-Internet technologies: e.g., wireless telephony, accessible satellite TV broadcasts, photo copier and fax machines, audio and video cassettes, etc.

Many in the Middle East, Africa, and South Asia want to use the information revolution to better themselves and their countries, but with widely varying abilities to do so.

## Some Interesting Analytic Constructs

A number of interesting analytic constructs were proposed during the conference, including:

### *The Technology, Artifact, Roles/Usage Model*

This model, illustrated schematically in Figure 12.1, is being developed by Crosby (2000) to describe the development and application of technology in various cultures. In this model: "technology" denotes an organized body of knowledge (e.g., information technology); "artifact" denotes the products of a technology (e.g., the desktop computer); "roles and usage" denotes applications of an artifact (e.g., desktop publishing).

This model was used by the Asia Pacific breakout group in discussing the course of the information revolution in its region. We intend applying it more broadly during our future efforts to chart the worldwide course of the information revolution.

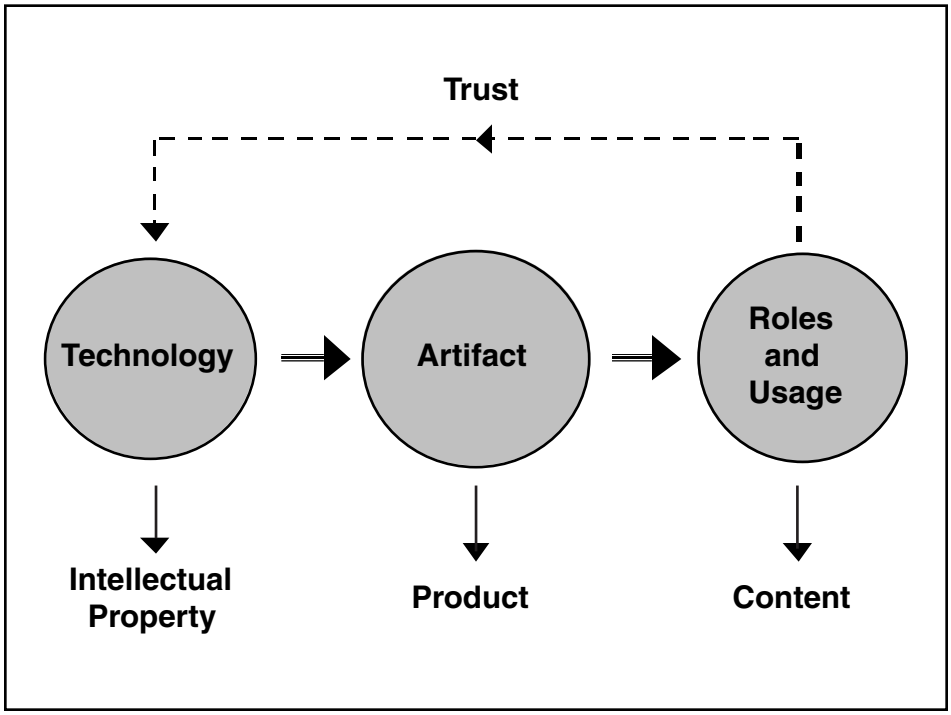


**Figure 12.1 The Technology, Artifact, Roles/Usage Model**

## *The Four C's*

The Middle East, Africa, and South Asia breakout group identified four factors that, acting as drivers or impediments of change, determine the adoption of, and substantial access to, information and communication technologies (ICT):[45]

- *Culture,* which includes as sub-factors language, nationalism, stratification, legal framework, vertical authority relationships, trust, meritocracy, and the concept of information (within the society).
- *Competence,* which includes as sub-factors education, training, and the sophistication of ICT use.
- *Capital,* which includes as sub-factors internal capital sources, external capital sources, and physical infrastructures (e.g., electric power, telecommunications).
- *Control,* which includes as sub-factors agency of control and form of control.

[45] More details of this model are given in Section 11.

The Middle East, Africa, and South Asia breakout group used this model to assess the capabilities of key countries in their region to access, adopt, and exploit information and communication technologies. We intend applying it more broadly during our future efforts to chart the worldwide course of the information revolution.

## *Driving Factors and Stunting Factors*

The Asia Pacific breakout group used a set of "driving" and "stunting" factors, shown in Table 12.1, to characterize the capability of the region as a whole and of individual nations across the technology–artifacts–roles/usage space: i.e., the capability to develop new information technology or new IR artifacts, or to use technology and artifacts developed by others.

**Table 12.1**

**Driving and Stunting Factors**

| | **Technology (Intellectual Property)** | **Artifact (Product)** | **Usage (Content)** |
|---|---|---|---|
| **Driving Factors** | • Education<br>• Equity capital access<br>• Venture spirit<br>• Local market potential | • Tax policy<br>• Plentiful, low-cost labor<br>• "ISP" effect | • Consumer wealth<br>• Taxation policy<br>• "ISP" effect<br>• Quality and availability of service |
| **Stunting Factors** | • Over regulation<br>• Government policy<br>• Intellectual property right violations<br>• Monopolies | • Low mfg./process technology<br>• Distribution and sourcing<br>• Legacy systems | • Censorship<br>• Lack of credit<br>• Trust of product<br>• Language |

The driving and stunting factors identified by the Asia Pacific group appear to be a subset of the "Four Cs" enumerated by the Middle East, Africa, and South Asia group. Our intent is to combine these constructs during our future efforts, using

the "Four Cs"(or an expanded set thereof) as an assessment device across the technology–artifacts–roles/usage space.

## Some Inferred Candidate National Models of the Information Revolution Future

The conference discussions did not explicitly develop a comprehensive set of models of what the information revolution future might be like in various nations and regions throughout the world. However, from those discussions it is possible to infer the following candidate set of national models of the information revolution future:

- *IR Achievers.* These are nations that have substantially attained most/all of the characteristics of "the great IR attractor." Information work and information workers represent an ever increasing fraction of the economy and the workforce; new, information-based business models and electronic commerce are spreading throughout the business and financial communities; many/most segments of society are well into the information age, and substantially "wired" into the global arena. Australia is one example (among several) of a nation that is today an IR Achiever.[46]
- *IR Drivers.* These are nations that go well beyond being merely an IR Achiever. They not only have attained most/all of the (then) existing characteristics of "the great IR attractor," but go well beyond this to create new characteristics, new manifestations of the information revolution. The U.S. is the best, but not the only, example of an IR Driver nation today.
- *IR Strivers.* These are nations that are working very hard to reach" the great IR attractor," but still have a considerable way to go, with the final result still in some doubt. Taiwan is an example of a nation that today is an IR Striver.
- *IR Modifiers.* These are nations that are not satisfied with one or more characteristics of "the great IR attractor" towards which they are being drawn, and wish to actively shape and modify those characteristics to suit their own ends. They are trying to change the course of the information revolution, insofar as it applies to them. Singapore is a clear example today of an IR Modifier. It is trying to realize all of the benefits of the information

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[46] This country assignment, as well as the others that follow, is very preliminary and meant merely to be illustrative.

revolution in the economic sphere, while at the same time strictly controlling developments in the social/cultural sphere.[47]

- *IR Veneer Societies.* These are nations in which a small fraction of the society is participating in the information revolution and well into the information age, with the vast bulk of the population still in the industrial or even the agricultural age. India is a clear example today of an IR Veneer Society. It has geographical clusters of high technology (e.g., around Bangalore), with software (and other) companies fully participating in the global information economy and some even on the NASDAQ stock exchange. At the same time, the vast majority of Indian citizens (probably 95% or more) are uninvolved in and unaffected by the information revolution.
- *IR Left-Behinds.* These are nations that have been more or less totally left behind by the information revolution. It has passed them by, for whatever reasons (most often socioeconomic). They are not involved, and largely unaware. Zaire is once such example, today, of an IR Left-Behind.
- *IR Luddites.* These are nations that, for whatever reason, actively oppose the course of the information revolution. They want to opt out. They don't want to participate. They don't want it happening in their society. They are more or less totally opposed to the changes being brought on by the information revolution. North Korea may be an example today of an IR Luddite.
- *Sore IR Losers.* These are nations that are unhappy left-behinds. They feel themselves losing out, as the information revolution progresses, and they are not happy with this outcome. It is not clear that any nation fits into this category today. But some could in the future.

This set of future models appears to span the range of situations suggested during the conference discussions. Most nations and regions should fit into one or another of these categories, insofar as the information revolution is concerned.[48] We intend using this set of models a point of departure during our future efforts to chart the worldwide course of the information revolution.[49]

In addition to this set of models, the European breakout group developed a set of four more specialized models -- *atomisation, corporatisation, regionalisation, and dynamic conservatism* – to describe that nature of the societal interactions in an information-revolution society. These models are described in Section 8.

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[47] Many doubt that Singapore can achieve its aims in this regard. Whether it ultimately succeeds or fails is immaterial to its present-day designation as an IR Modifier.

[48] At any given time, some of these models could be empty sets, and some nations could be in more than one category.

[49] During these future efforts, this set of models will most likely evolve and change.